

What is claimed is:

1. A control device for a motor fan of a vehicle, which controls the motor fan to cool a radiator for engine coolant and a condenser for air conditioner refrigerant, comprising:
  - 5 a first command value calculation section which calculates a first command value for control of the motor fan according to refrigerant pressure;
  - a second command value calculation section which
  - 10 calculates a second command value for control of the motor fan according to coolant temperature;
  - a first target value setting section which sets the greater of the first command value and the second command value as a first target value;
  - 15 a second target value setting section which obtains a second target value for control of the motor fan which corresponds to a total torque which is smaller than a total torque of a torque of an alternator and a torque of a compressor corresponding to the first target value; and
  - 20 a control section which controls the motor fan according to the second target value, wherein
  - the second target value setting section corrects the total torque of the torque of the alternator and the torque of the compressor based upon a predetermined condition when
  - 25 obtaining the total torque of the torque of the alternator

and the torque of the compressor.

2. A control device for a motor fan of a vehicle according to Claim 1, wherein the second target value setting section  
5 corrects the total torque of the torque of the alternator and the torque of the compressor, based upon a rotational speed of a blower fan motor.

3. A control device for a motor fan of a vehicle according  
10 to Claim 1, wherein the second target value setting section corrects the total torque of the torque of the alternator and the torque of the compressor, based upon a rotational speed of a blower fan motor and an external temperature.

15 4. A control device for a motor fan of a vehicle according to Claim 1, wherein the second target value setting section sets the second target value with a command value for control of the motor fan which is greater than the first target value and corresponds to a minimum value of the total torque of the  
20 torque of the alternator and the torque of the compressor .

5. A control device for a motor fan of a vehicle according to Claim 1, wherein:  
the second target value setting section obtains a target  
25 refrigerant pressure in correspondence to the second target

value and further corrects the second target value so as to bring the refrigerant pressure of the air conditioner towards the obtained target refrigerant pressure after the control section has controlled the motor fan according to the second  
5 target value.; and

the control section further controls the motor fan according to the second target value which has been further corrected.

10 6. A control device for a motor fan of a vehicle, which controls a motor fan by duty ratio control to cool a radiator for engine coolant and a condenser for air conditioner refrigerant, comprising:

a first command value calculation section which  
15 calculates a first command value of duty ratio according to refrigerant pressure;

a second command value calculation section which calculates a second command value of duty ratio according to coolant temperature;

20 a first target value setting section which sets the greater of the first command value and the second command value as a first target value of duty ratio;

a second target value setting section which calculates a total torque of a torque of an alternator and a torque of  
25 a compressor, and sets a duty ratio for which the total torque

becomes a minimum as a second target value; and

a duty ratio determination section which sets the greater of the first target value and the second target value as a final duty ratio, wherein

5 the second target value setting section corrects the calculated total torque of the torque of the alternator and the torque of the compressor based upon a rotational speed of a blower fan motor, and sets a duty ratio for which the corrected total torque becomes minimum as the second target  
10 value.

7. A control device for a motor fan of a vehicle according to Claim 6, wherein the second target value setting section corrects the total torque based upon the rotational speed of  
15 the blower fan motor and an external temperature.

8. A control device for a motor fan of a vehicle according to Claim 6, further comprising:

a duty ratio control section which controls the duty  
20 ratio, wherein

the duty ratio control section controls the final duty ratio which has been determined so as to bring the refrigerant pressure of the air conditioner towards a target refrigerant pressure.

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9. A control device for a motor fan of a vehicle, comprising:  
an engine;  
an alternator which is driven by the engine;  
an air conditioning device of which a compressor is  
5 driven by the engine;  
an electrically driven motor fan which is operated by  
receiving supply of electrical power generated by the  
alternator, and which cools the air conditioning device;  
a discharge pressure detection section which detects  
10 a discharge pressure of the compressor;  
a target discharge pressure setting section which sets  
a target discharge pressure of the compressor with respect  
to a cooling performance which is required from the air  
conditioning device, so that a total of a drive load of the  
15 compressor and a drive load of the alternator for obtaining  
electrical power for operating the electrically driven motor  
fan becomes a minimum; and  
a motor fan control section which controls an operation  
of the electrically driven motor fan so that the discharge  
20 pressure of the compressor becomes equal to the target  
discharge pressure.

10. A control device for a motor fan of a vehicle according  
to Claim 9, wherein the target discharge pressure is set  
25 according to a representative temperature in a neighborhood

of the vehicle.

11. A control device for a motor fan of a vehicle according to Claim 10, further comprising:

5 an external air temperature detection section which detects an external air temperature, wherein

the representative temperature is the external air temperature which is detected by the external air temperature detection means.

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12. A control device for a motor fan of a vehicle according to Claim 9, wherein:

the electrically driven motor fan cools both the engine and the air conditioning device; and

15 the motor fan control section operates the electrically driven motor fan according to the greater of a control amount which is set so that the discharge pressure of the compressor becomes equal to the target discharge pressure, and a control amount which is set so that an engine cooling water temperature  
20 becomes equal to a target engine cooling water temperature which has been set in advance.

13. A control device for a motor fan of a vehicle according to Claim 9, wherein the motor fan control section operates  
25 the electrically driven motor fan at its maximum control amount,

when the discharge pressure of the compressor exceeds a predetermined value.

14. A control device for a motor fan of a vehicle according  
5 to Claim 9, further comprising:

an engine cooling water temperature detecting section  
which detects an engine cooling water temperature, wherein  
the motor fan control section operates the electrically  
driven motor fan at its maximum control amount, when the engine  
10 cooling water temperature exceeds a predetermined value.

15. A control method for a motor fan of a vehicle, which  
controls the motor fan to cool a radiator for engine coolant  
and a condenser for air conditioner refrigerant, comprising:

15 calculating a first command value for control of the  
motor fan according to refrigerant pressure;

calculating a second command value for control of the  
motor fan according to coolant temperature;

setting the greater of the first command value and the  
20 second command value as a first target value;

obtaining a second target value for control of the motor  
fan which corresponds to a total torque which is smaller than  
a total torque of a torque of an alternator and a torque of  
a compressor corresponding to the first target value; and

25 controlling the motor fan according to the second target

value, wherein

the total torque of the torque of the alternator and the torque of the compressor is corrected based upon a predetermined condition when obtaining the total torque of the torque of the alternator and the torque of the compressor.

16. A control method for a motor fan of a vehicle which controls the motor fan to cool an air conditioning device of which a compressor is driven by an engine, comprising:

10 detecting a discharge pressure of the compressor;  
setting a target discharge pressure of the compressor with respect to a cooling performance which is required from the air conditioning device, so that a total of a drive load of the compressor and a drive load of the alternator for obtaining electrical power for operating the motor fan becomes a minimum; and

controlling an operation of the motor fan so that the discharge pressure of the compressor becomes equal to the target discharge pressure.

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17. A control device for a motor fan of a vehicle, which controls the motor fan to cool a radiator for engine coolant and a condenser for air conditioner refrigerant, comprising:

a first command value calculation means for calculating  
25 a first command value for control of the motor fan according



to refrigerant pressure;

a second command value calculation means for calculating a second command value for control of the motor fan according to coolant temperature;

5 a first target value setting means for setting the greater of the first command value and the second command value as a first target value;

a second target value setting means for obtaining a second target value for control of the motor fan which  
10 corresponds to a total torque which is smaller than a total torque of a torque of an alternator and a torque of a compressor corresponding to the first target value; and

a control means for controlling the motor fan according to the second target value, wherein

15 the second target value setting means corrects the total torque of the torque of the alternator and the torque of the compressor based upon a predetermined condition when obtaining the total torque of the torque of the alternator and the torque of the compressor.

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18. A control device for a motor fan of a vehicle, comprising:

an engine;

an alternator which is driven by the engine;

an air conditioning device of which a compressor is  
25 driven by the engine;

an electrically driven motor fan which is operated by receiving supply of electrical power generated by the alternator, and which cools the air conditioning device;

a discharge pressure detection means for detecting a  
5 discharge pressure of the compressor;

a target discharge pressure setting means for setting a target discharge pressure of the compressor with respect to a cooling performance which is required from the air conditioning device, so that a total of a drive load of the  
10 compressor and a drive load of the alternator for obtaining electrical power for operating the electrically driven motor fan becomes a minimum; and

a motor fan control means for controlling an operation of the electrically driven motor fan so that the discharge  
15 pressure of the compressor becomes equal to the target discharge pressure.